CLAIMS

1. A piezoelectric vibrator comprising:

a piezoelectric plate, whose polarization points in a direction of a thickness, having a first face and a second face;

a first electrode for covering the first face;

a second electrode for covering the second face;

a first dielectric film for covering the electrode; and

a second dielectric for covering the second electrode,

wherein the piezoelectric plate employs thickness longitudinal vibration as principal vibration,

wherein the first dielectric and the second dielectric have substantially the same thickness and area each other.

2. The piezoelectric vibrator of claim 1,

wherein the piezoelectric plate is made of aluminum nitride.

3. The piezoelectric vibrator of claim 1,

wherein at least one of the first dielectric film and the second dielectric film is made of silicon oxide.

4. The piezoelectric vibrator of claim 1,

wherein at least one of the first dielectric film and the second dielectric film is made of silicon nitride.

5. The piezoelectric vibrator of claim 1,

wherein the dielectric film is formed of a laminated layer of silicon oxide and silicon nitride.

6. The piezoelectric vibrator of claim 1,

wherein the principal vibration is a fundamental mode of the thickness longitudinal vibration.

7. The piezoelectric vibrator of claim 1,

wherein the principal vibration of the piezoelectric plate is a 2nd overtone mode of the thickness longitudinal vibration.

8. The piezoelectric vibrator of claim 1,

wherein a ratio of a sum of a thickness of the first dielectric film and the second dielectric film to a thickness of the piezoelectric plate ranges not less than 0.7 and not more than 2.0.

9. A piezoelectric filter comprising:

a piezoelectric vibrator including:

a piezoelectric plate, whose polarization points in a direction of a thickness, having a first face and a second face;

a first electrode for covering the first face;

a second electrode for covering the second face;

a first dielectric film for covering the electrode; and

a second dielectric for covering the second electrode,

wherein the piezoelectric plate employs thickness longitudinal vibration as principal vibration,

wherein the first dielectric and the second dielectric have substantially the same thickness and area each other.

10. The piezoelectric filter of claim 9,

wherein the piezoelectric filter is a ladder type filter formed by combining at least two of the piezoelectric vibrators.

11. The piezoelectric filter of claim 10,

wherein a ratio of a sum of a thickness of the first dielectric film and the second dielectric film to a thickness of the piezoelectric plate ranges not less than 0.7 and not more than 2.0.

12. The piezoelectric filter of claim 9,

wherein the piezoelectric filter is a double mode filter where the plurality of piezoelectric vibrators are formed at the piezoelectric plate.

13. The piezoelectric filter of claim 12,

wherein the first electrode is divided into an electrode for inputting and an electrode for outputting, and the second electrode is used as an electrode for grounding.

14. A method of adjusting a piezoelectric vibrator, the piezoelectric vibrator comprising:

a piezoelectric plate, whose polarization points in a direction of a thickness, having a first face and a second face;

a first electrode for covering the first face;

a second electrode for covering the second face;

a first dielectric film for covering the electrode; and

a second dielectric for covering the second electrode;

the method comprising:

adjusting a resonance frequency of the piezoelectric vibrator by changing at least one of the first dielectric film and the second dielectric film,

wherein the piezoelectric plate employs thickness longitudinal vibration as principal vibration,

wherein the first dielectric and the second dielectric have substantially the same thickness and area each other.